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FIRST GEOSYNCHRONOUS WEATHER SATELLITE PREPARED FOR LAUNCH

In a major step forward in the use of space observations to advance the science of weather forecasting, NASA is preparing to launch the first Synchronous Meteorological Satellite (SMS-A) from Kennedy Space Center, Fla., no earlier than May 16.

The cylindrical 627-kilogram (1,379-pound) spacecraft will be carried to its station 36,357 kilometers (22,591 miles) over the Atlantic (45° W longitude) by a Delta 2914 launch vehicle.

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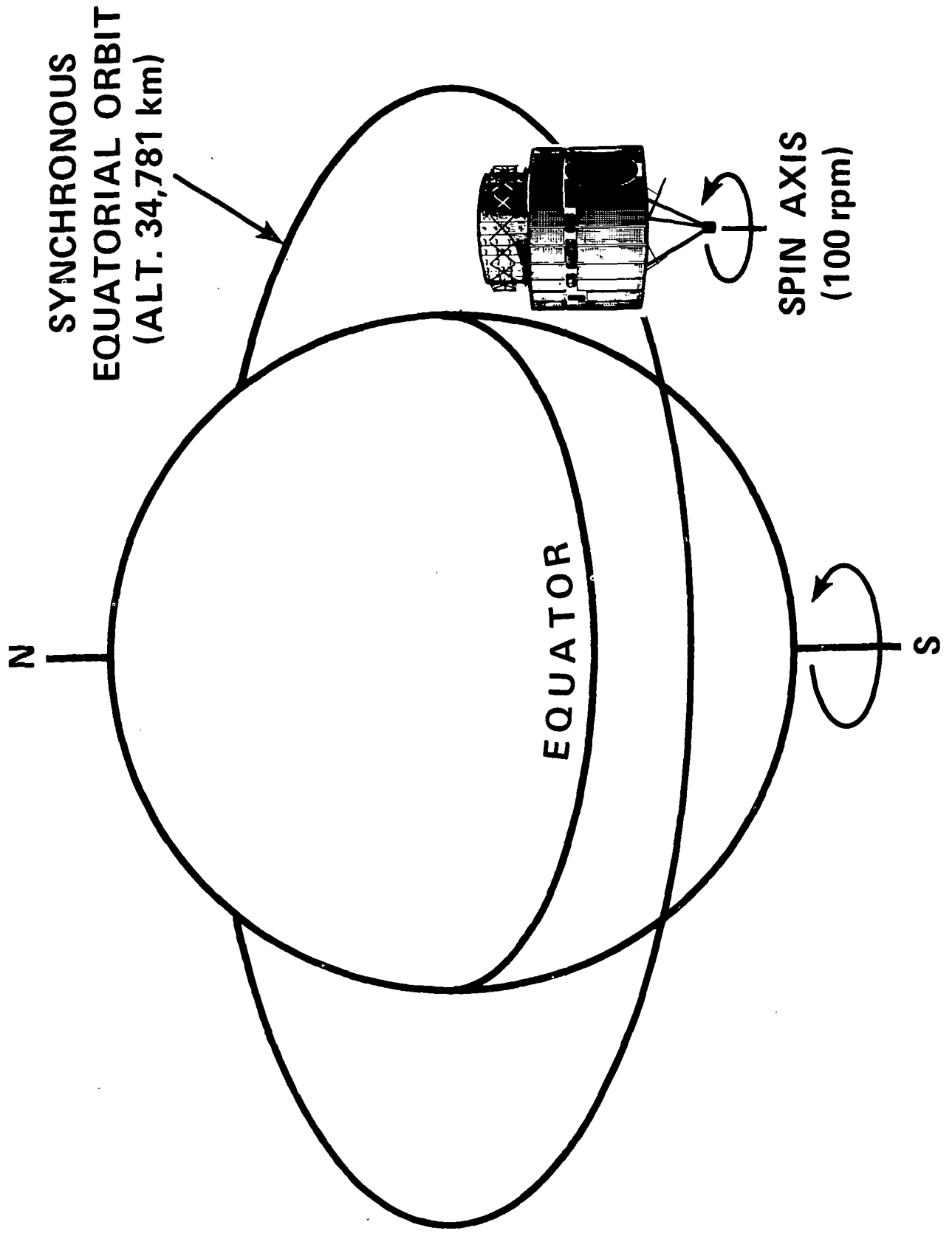
April 19, 1974

From its initial stationary position over the equator just off the coast of Brazil,the satellite will transmit electronic data to produce day and night pictures of the Western Hemisphere every 30 minutes; receive and transmit environmental information from up to 10,000 manned and unmanned data collection platforms; transmit and relay weather data and pictures to hundreds of small receiving stations; and monitor solar flare activity for future manned spacecraft and supersonic aircraft flights.

An onboard telescope will be able to produce .9-kilometer (1/2-mile) resolution images in visible light, and 9-kilometer (5-mile) resolution images during night time using infrared sensors.

These electronically devised images will be received at the National Oceanic and Atmospheric Administration (NOAA) Command and Data Acquisition Station, Wallops Island, Va., and from there transmitted to the National Environmental Satellite Service (NESS) at Suitland, Md., for national and worldwide distribution.


SYNCHRONOUS
EQUATORIAL ORBIT
(ALT. 34,781 km)
SPIN AXIS
(100 rpm)
EQUATOR
N
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Images will be "stretched" for lower data rate retransmission through SMS from Wallops to the NOAA Central Data Distribution Facility, Marlow Heights, Md. The pictures will be sectorized and transmitted via land line to regional analysis and distribution centers in Miami, San Francisco, Kansas City, Washington, and later Honolulu. Twelve sectors make up the continental U.S.

The regional analysis and distribution centers, or Satellite Field Services Stations (SFSS), will receive the sectorized pictures and infrared data from the Central Data Facility, reduce these data to video imagery for analysis and interpretation, and then route the sectors to Weather Service Forecast Offices (WSFO) that each SFSS supports. The WSFOs can receive either visible weather pictures or infrared pictures every 30 minutes.

All SFSS stations, besides receiving standard sector data direct from the Central Data Facility on a continuous basis, will be able to receive two Northern Hemisphere sectors of their own choosing every 30 minutes. The Miami station will also be able to receive sectors as required south of the equator. Southern Hemisphere pictures are important to the Miami station especially for hurricane information.

Data, including weather maps and pictures, also can be transmitted via the satellite directly to some 500 small Automatic Picture Transmission (APT) stations, most of them in the Western Hemisphere.

In an experiment that is expected to get underway in September 1974, 20 balloons will be released by the National Center for Atmospheric Research (NCAR) over a period of 90 days from the balloon launch site in French Guiana operated by the French National Center for Space Studies. The balloons will reach an altitude of about 30 kilometers (100,000 feet) and will float around the globe at the equator. Each balloon will carry transmitting and receiving equipment as well as 64 dropsondes (instrumented packages dropped by parachute) each weighing 400 grams (14 ounces).

Working with both SMS and Nimbus F, a meteorological satellite to be launched next fall, the Carrier Balloon System will sample vertical wind data as well as temperature and humidity data at many points around the world as the dropsondes are released and drift to Earth. This information will be transmitted from each dropsonde through the Carrier Balloon Electronic Package, through SMS, to the Wallops Island, Va., Command and Data Acquisition Station, and by land line to the NCAR facility at Boulder, Colo. NCAR will process the data.

Lifetime of the balloons, which will circle Earth every 15 to 25 days between 10° N and 10° S, are expected to be at least 90 days and possibly as much as one year. The dropsondes will be released on command through the SMS from the Wallops Island ground station. Two to four releases a day are planned.

The tropic area was chosen for release of the balloons because there is a major gap in knowledge of equatorial winds which affect long-range forecasting capability.

SMS also will test for the first time a widespread data collection system designed to provide NOAA with near real-time (as it happens) data from the planned 10,000 Data Collection Platforms (DCP) spread around the United States on land, in rivers and lakes, and at sea.

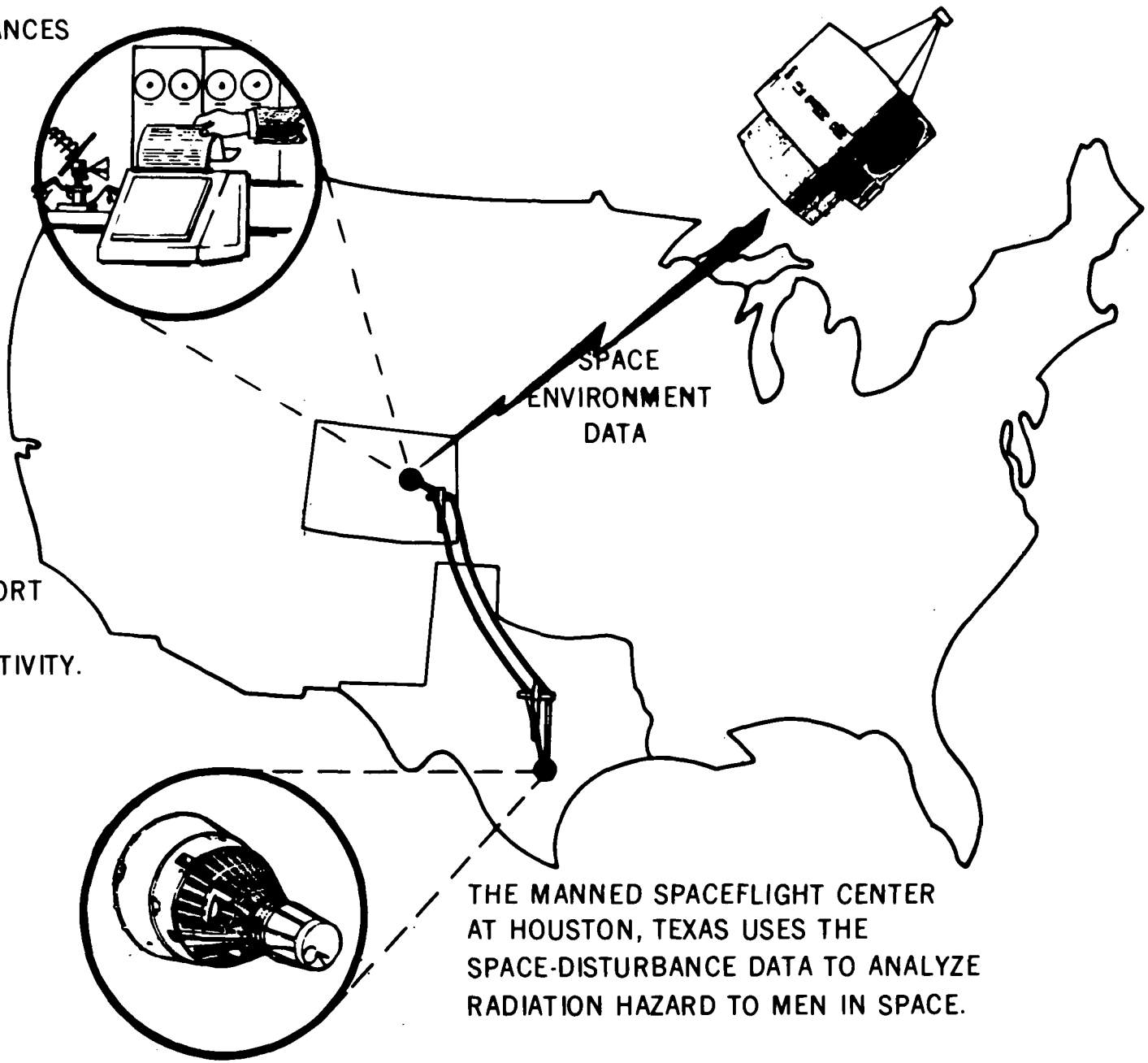
The platforms are small environmental sensing stations that collect data and transmit them through the satellite to the Command and Data Acquisition Station and from there by land line to NOAA's Data Processing Facility. Most are unmanned small platforms, although some will be on board ships.

The primary type of data to be obtained are meteorological, hydrological, oceanographic, seismic, and tsunami information. For example, fixed platforms in remote land areas will send information on earthquakes, wind direction and velocity rainfall, and the humidity. River platforms will measure currents, water levels, and temperatures. Platforms at sea, fixed or floating, will measure tides, water temperatures, and air temperatures and give tsunami warnings.

The Space Environment Monitoring (SEM) System carried on SMS-A is designed to provide direct measurement of important effects of solar activity, such as solar flares, in real time. NOAA will use SEM in studying solar effects on the environment and for advisory or warning messages on possible significant solar radiation hazards or conditions. SEM information is expected to be especially useful to warn manned spacecraft, and later on supersonic aircraft, of potential solar radiation dangers. Also it is expected to be used for radio communications blackout alerts. Continuous monitoring is needed for these data, and past studies have shown satellite data is at least ten times as accurate in picking up small solar flares as ground-based equipment.

SPACE ENVIRONMENT MONITORING (SEM) SYSTEM

THE SPACE DISTURBANCES LABORATORY OF THE NOAA RESEARCH LABORATORIES AT BOULDER, COLORADO RECEIVES THE SPACE ENVIRONMENT DATA, AND FORMATS IT BY COMPUTER INTO BULLETINS FOR SPACE-DISTURBANCE FORECASTING TO SUPPORT THE MANNED SPACE PROGRAM, SUPERSONIC TRANSPORT FLIGHTS, AND COMMUNICATIONS ACTIVITY.



THE MANNED SPACEFLIGHT CENTER AT HOUSTON, TEXAS USES THE SPACE-DISTURBANCE DATA TO ANALYZE RADIATION HAZARD TO MEN IN SPACE.

NASA and the National Oceanic and Atmospheric Administration, Department of Commerce, are working toward Geostationary Operational Environmental Satellite (GOES) System, with NASA's Goddard Space Flight Center, Greenbelt, Md., responsible for designing, developing and evaluating the spacecraft and ground system, for spacecraft checkout in orbit, and for the launch vehicle and launch operations.

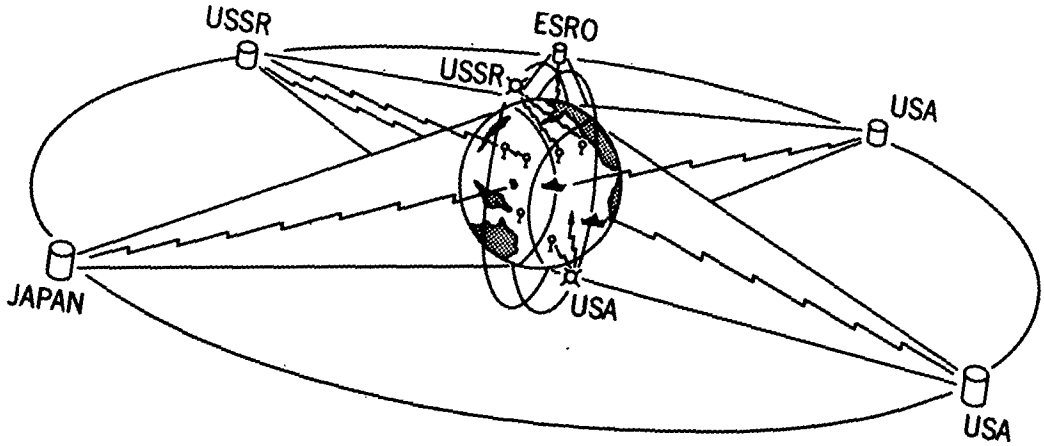
NOAA is responsible for operation of the satellites, the ground system, acquiring and processing data, and deciding when a replacement spacecraft is needed.

A few months after the first SMS is launched, another one, SMS-B, will be placed over the Pacific Ocean at near 130° W longitude. When NASA has thoroughly checked out each spacecraft, these two prototype satellites will be turned over to NOAA for full operational use and control.

Later in the year, the first NOAA-funded synchronous orbit satellite will be launched by NASA. This spacecraft, after initial checkout by Goddard, also will be under full operational control of NOAA. The two NASA satellites will be called, upon attaining orbit, SMS-1 and SMS-2. NOAA's first satellite will be called GOES-1, for Geostationary Operational Environmental Satellite.

Five operational synchronous satellites, working in conjunction with one or two near-Earth satellites in near-polar orbits will be used as the space based observational element of the internationally supported Global Atmospheric Research Program (GARP).

In the late 1970s, the European Space Research Organization (ESRO), Japan, and the Soviet Union are expected to join the U.S. in providing meteorological satellites in synchronous orbit. The spacecraft will be about 70° apart, spaced around the world. The U.S. satellites then will cover the western hemisphere; ESRO's satellite will observe Europe, and near Eastern areas; Africa, the USSR spacecraft will cover the Soviet Union as well as other parts of Asia and India; and the Japanese will close the global system with a spacecraft monitoring the Far East and the Western Pacific Ocean. All except the Russian spacecraft are planned to be launched aboard Delta launch vehicles from Kennedy Space Center, Fla.



GLOBAL OBSERVING SYSTEM

The first satellite, SMS-A, will participate this year in the first international field experiment of the Global Atmospheric Research Program (GARP), the research arm of the World Meteorological Organization's World Weather Program. This first experiment, beginning in June this year and ending September 30, is called the GARP Atlantic Tropical Experiment (GATE). As part of GARP's goal to increase man's knowledge of the atmosphere and learn causes of climate variations, GATE will investigate Earth's tropical belt from the eastern Pacific to the Indian Ocean with ships, aircraft, land stations, satellites, and instrumented ocean buoys

The United States has been launching weather satellites since 1960. Since the satellite system became operational in 1966, very few major storms anywhere in the world have gone undetected by one of these weather satellites. In fact, meteorological services around the world rely on their continued operation for up-to-date information about the weather especially violent storms or hurricanes.

These satellites, flying polar orbits, observe each spot on Earth twice a day The geosynchronous satellites, with their full-disk coverage of Earth every 30 minutes, will supplement that coverage by providing the added short-term observations required by local forecasters around the clock, especially of severe weather phenomena such as tornadoes.

Some work has been done already in predicting short-term severe weather phenomena based on the photos received from SMS's predecessors, Applications Technology Satellites-1 and -3, launched in December 1966 and November 1967, respectively. ATS-1 provided the first synchronous-orbit black-and-white photos of Earth, and ATS-3 provided the first color photos.

SMS-A will be launched by a three-stage Delta rocket with nine strap-on solid motors. It will be placed into a 185-kilometer (115-mile) parking orbit and allowed to coast to the first equator crossing off the Coast of Africa. There, the third stage and SMS will be separated from the second stage and the third stage will then ignite to inject the spacecraft into a transfer orbit with an apogee of 36,357 kilometers (22,591 miles) where it will be fired into synchronous orbit by the solid-propellant Apogee Boost Motor on the spacecraft at the first or second apogee. SMS will be drifted to its station at 45° W longitude in 15 to 20 days depending on which apogee the firing takes place.

SMS program management is under the direction of NASA's Office of Applications, with project management the responsibility of the Goddard Space Flight Center, Greenbelt, Md., which also manages the Delta launch vehicle project. Philco-Ford, Palo Alto, Calif., is the spacecraft prime contractor. The Santa Barbara Research Center of the Hughes Aircraft Company has developed and produced the Visible and Infrared Spin Scan Radiometer which is the main sensor for SMS. McDonnell Douglas Astronautics Co., Huntington Beach, Calif., is the prime contractor for the Delta. Launch services are provided by Kennedy Space Center's Unmanned Launch Operations Directorate.

The spacecraft, including all onboard instrumentation, cost about $45 million for the first three. The Delta rocket and launch services cost about $8.6 million each launch.

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